

2024 Battelle Chlorinated Conference

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HRSC Techniques Used to Identify Preferential Flow Paths and Inform Monitoring Well Screened Intervals in a Heterogeneous Aquifer

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Agenda

1. Brief overview of project site
2. Work completed in summer/fall 2023
3. Results and discussion
4. Work to be completed in summer 2024



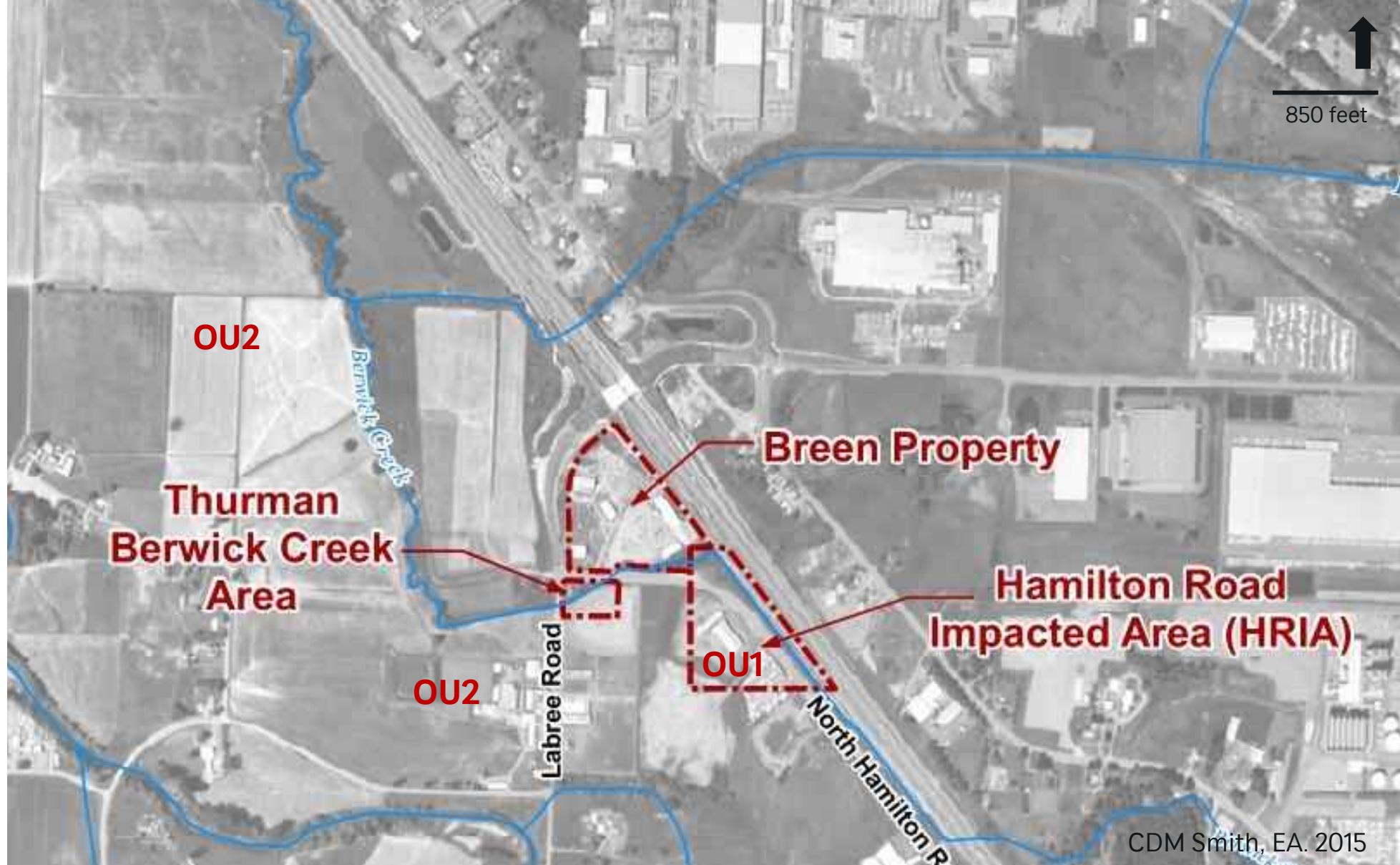
Project Site Background and Overview

Site Background

- Agricultural, residential, commercial
- Contamination likely due to spill or direct release of tetrachloroethene (PCE) into adjacent creek
- Responsible party(ies) and date of release unknown, likely 1970s to 1990
- Additional potential source areas identified (e.g., buried drums, wash-down pads)
- Currently two operable units



Site Background



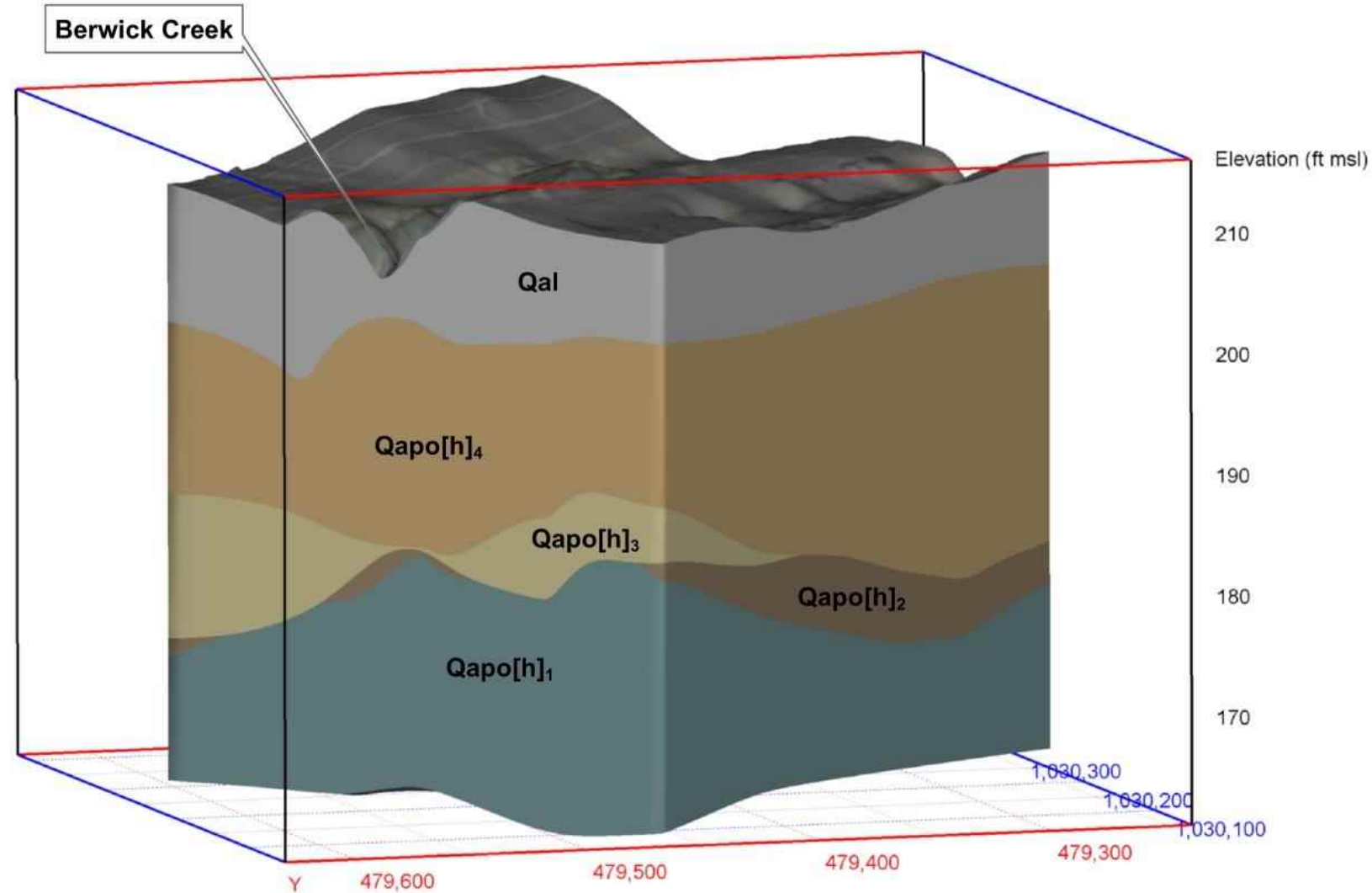
Hydrogeologic Framework

Qapo(h)₄ – Upper glaciofluvial outwash deposit.

Qapo(h)₃ – Discontinuous mudflow or till-like deposit.

Qapo(h)₂ – Discontinuous advance outwash sand deposit.

Qapo(h)₁ – Lower glaciofluvial outwash deposit.



3D Visualization of Site Stratigraphy
Vertical Exaggeration = 5X

CDM Smith, EA. 2015



Field Investigation 2023

Data Gaps To Be Addressed During Field Investigation

- Relative contribution of sources to sitewide plume
 - Characterization and delineation of potential source areas (in OU2)
 - Preferential pathways affecting plume transport
 - Nature and extent of plume
 - Groundwater flow, contaminant fate and transport
- Groundwater/surface water interaction
 - Sediment impacts in local creeks
 - Characterization of deep aquifer (below Wilkes Formation)
 - Updated survey data and sampling results for existing monitoring wells
 - Updated evaluations of Human Health Risk

High Resolution Site Characterization Through DPT Exploratory Borings

From EPA Contaminated Site Clean-up Information:

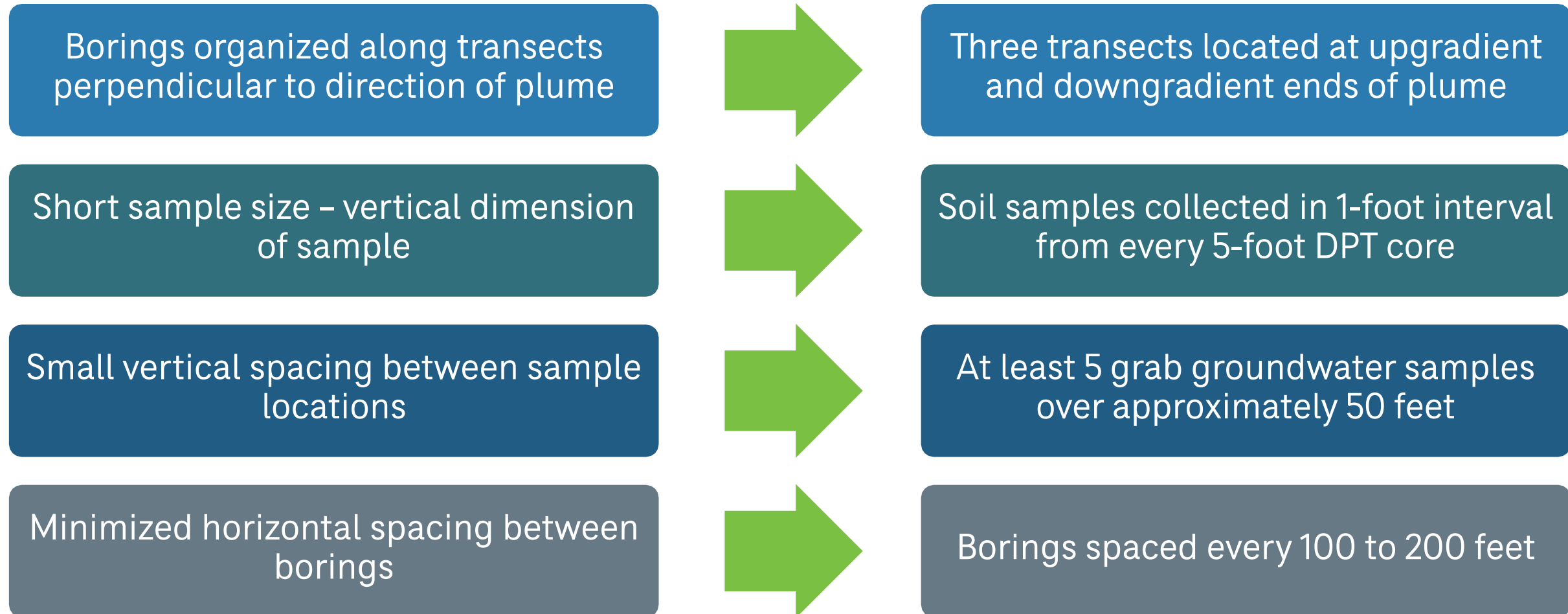
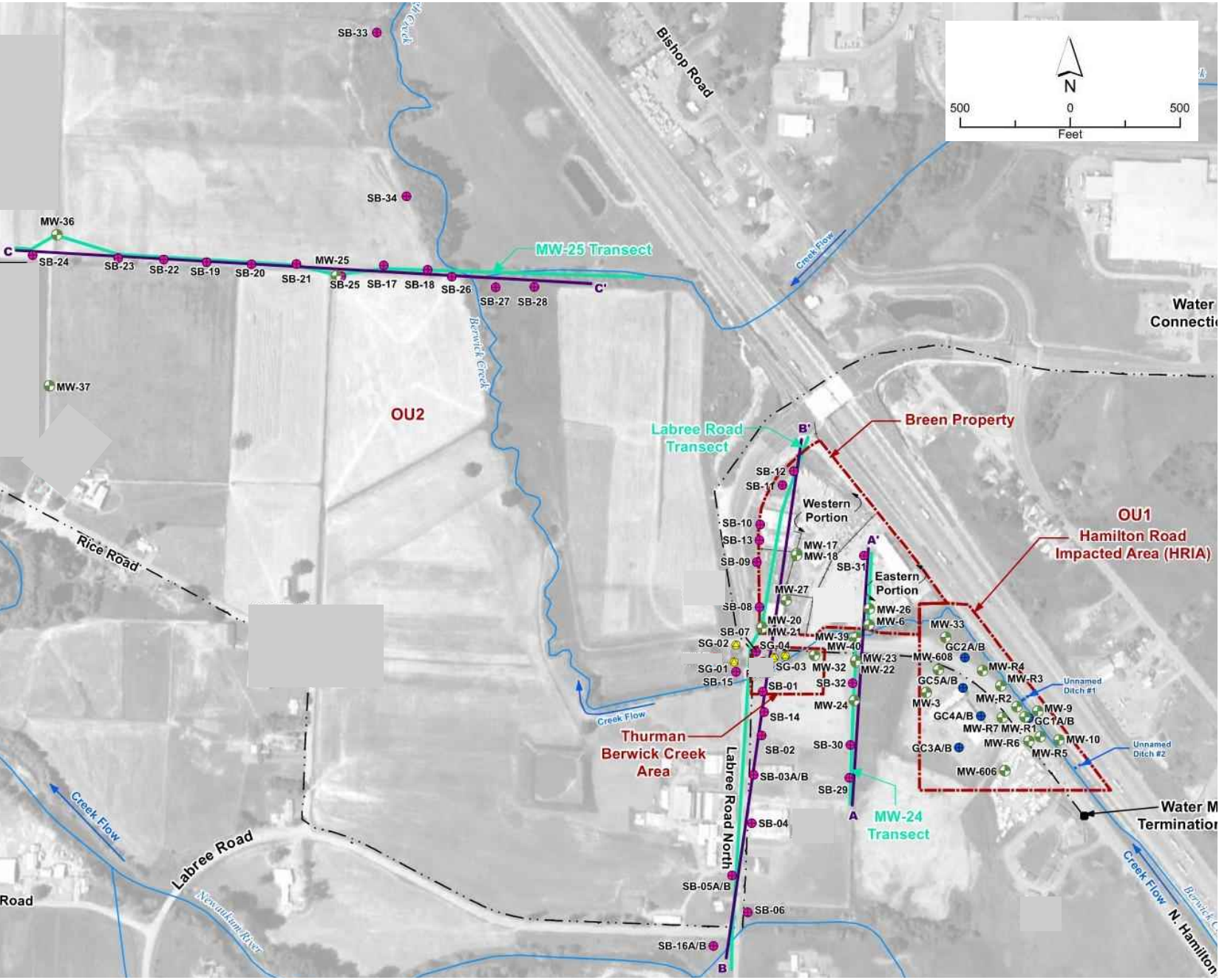


Photo taken by August Welch, CDM Smith in 2014



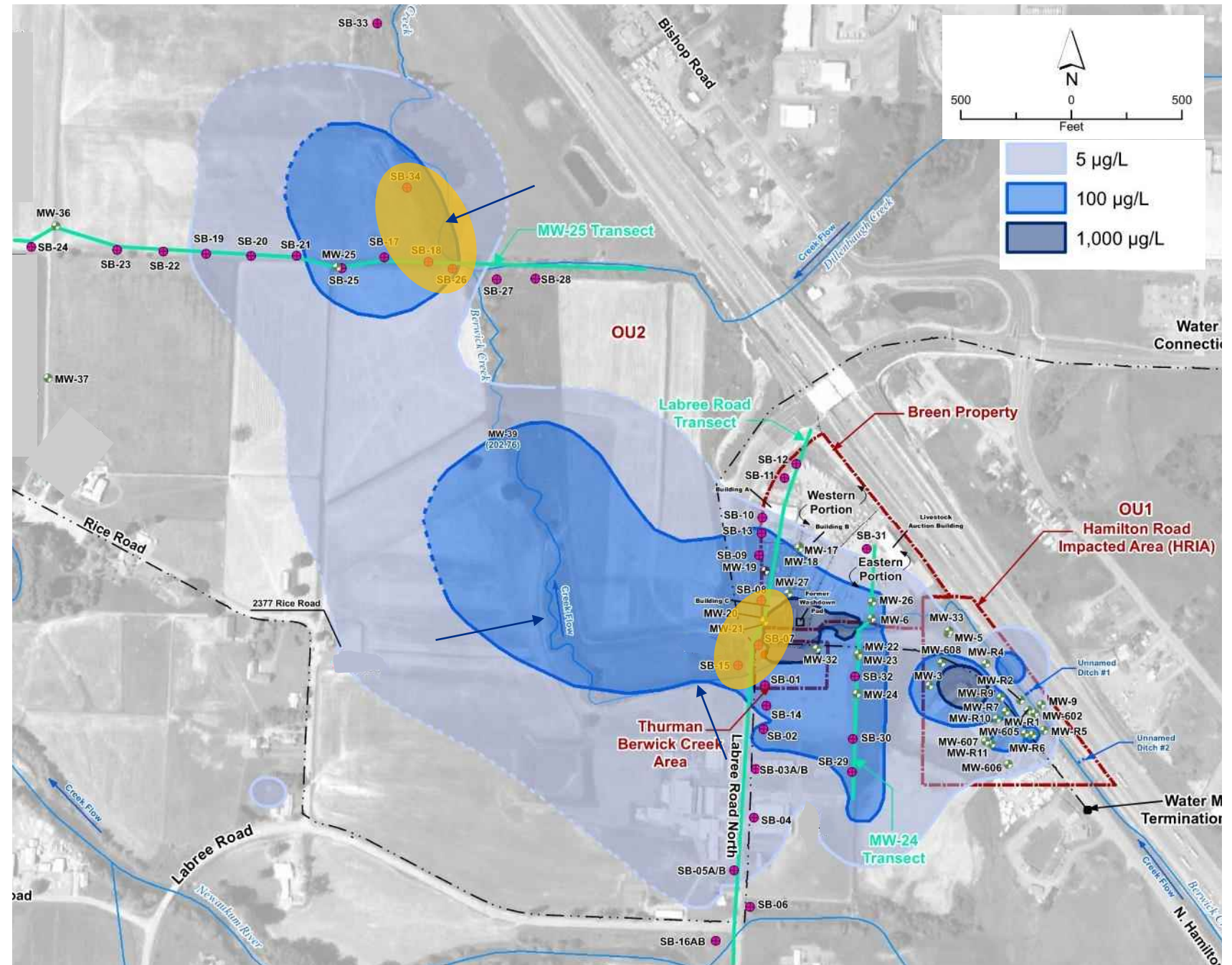
DPT Exploratory Borings Along Three Transects



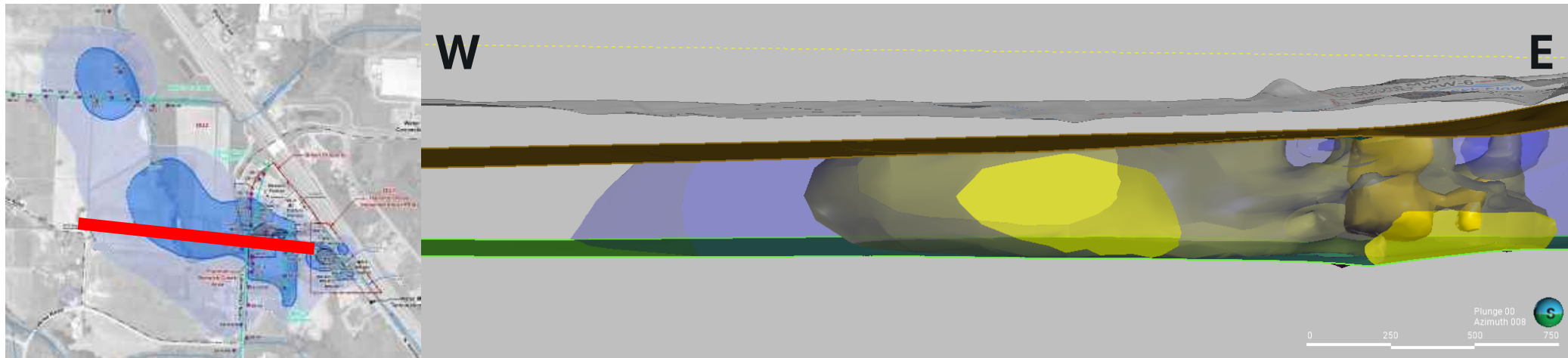
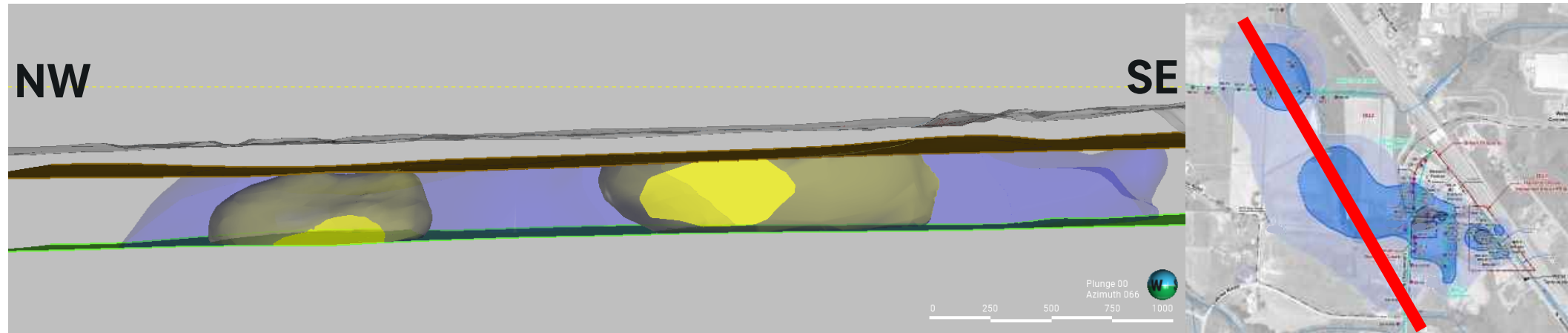


Results and Discussion

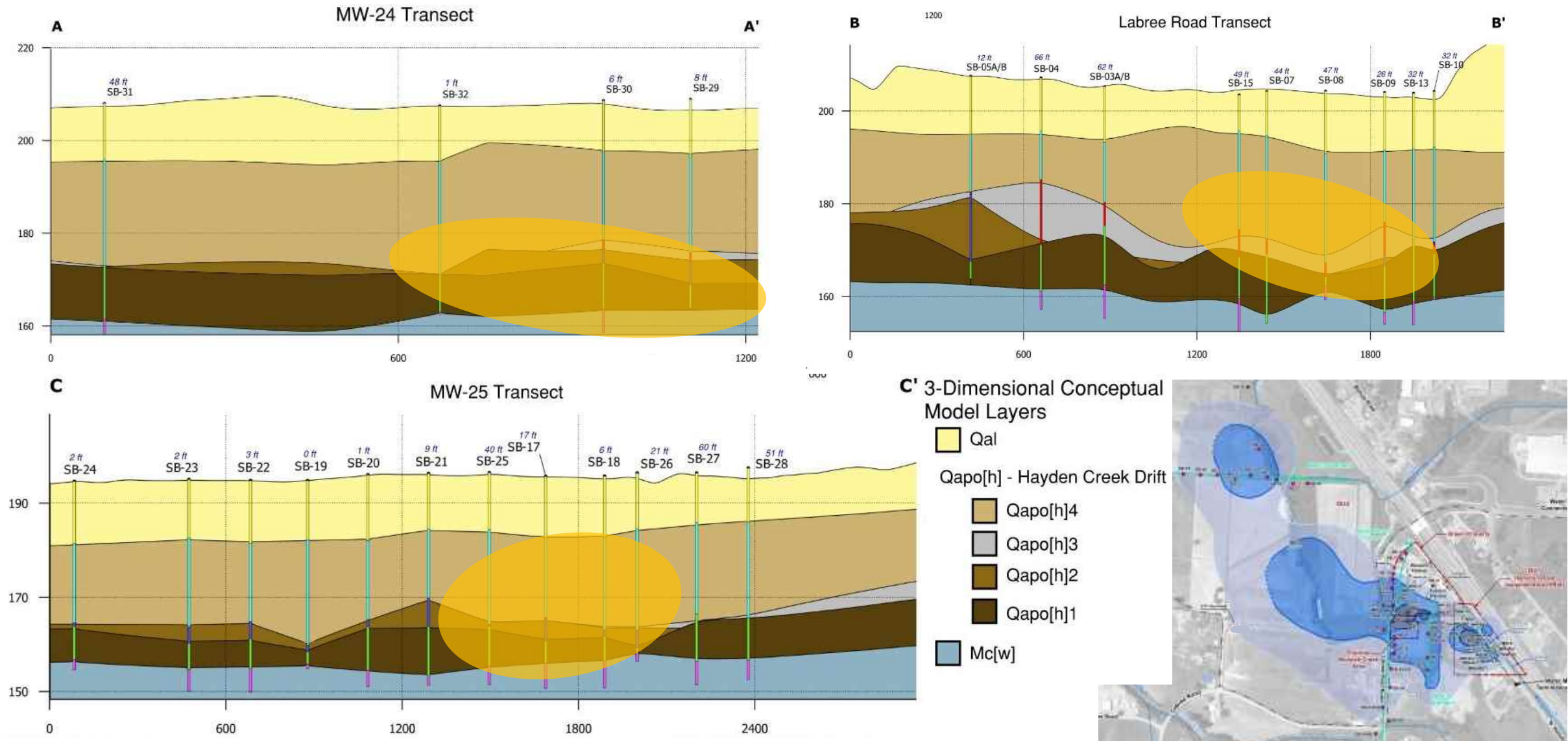
PCE Plume Extent AFTER 2023 Field Investigation



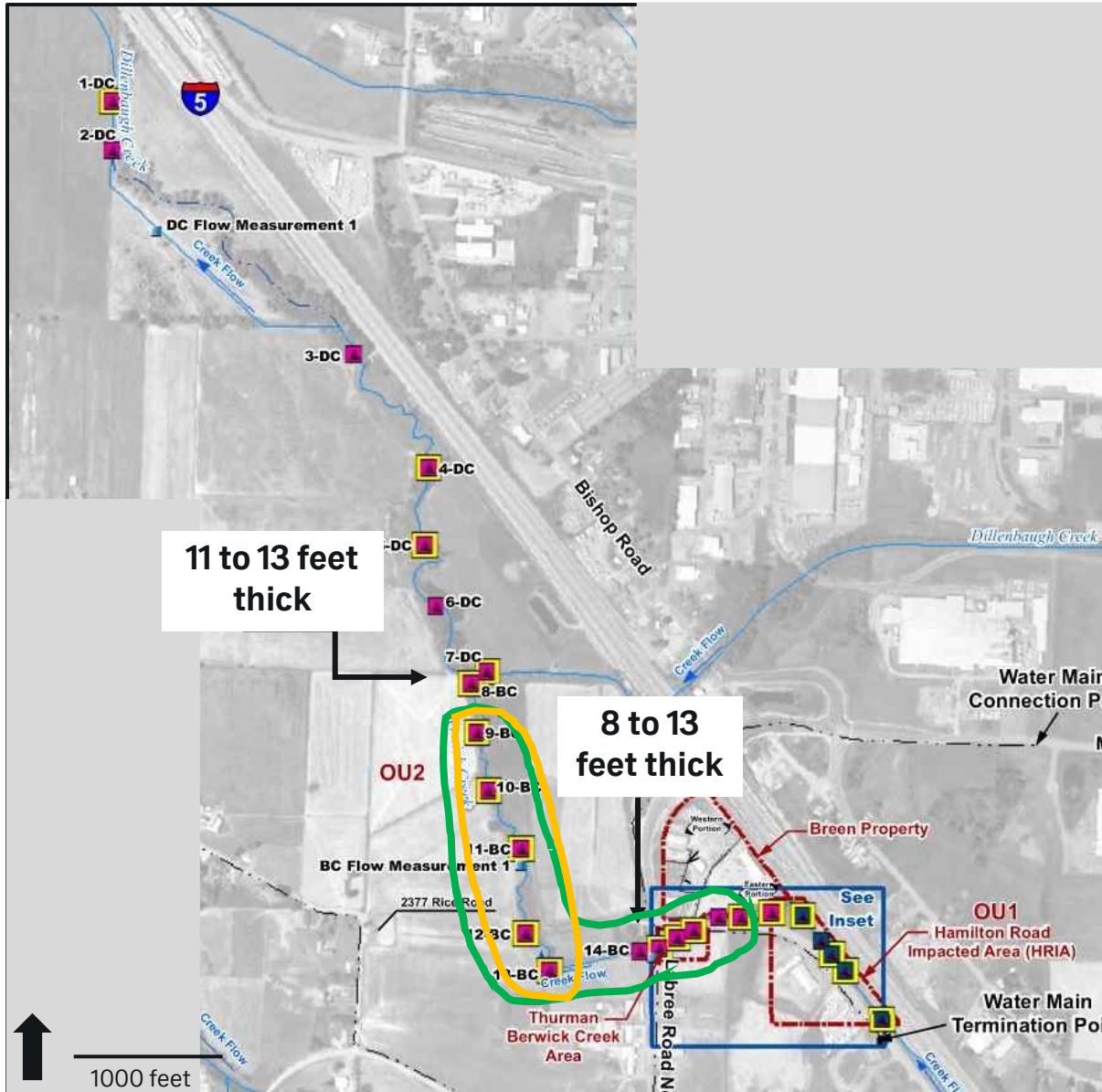
3DVA Model Cross Sections Through Subsurface Plume



Stratigraphy and PCE Concentrations

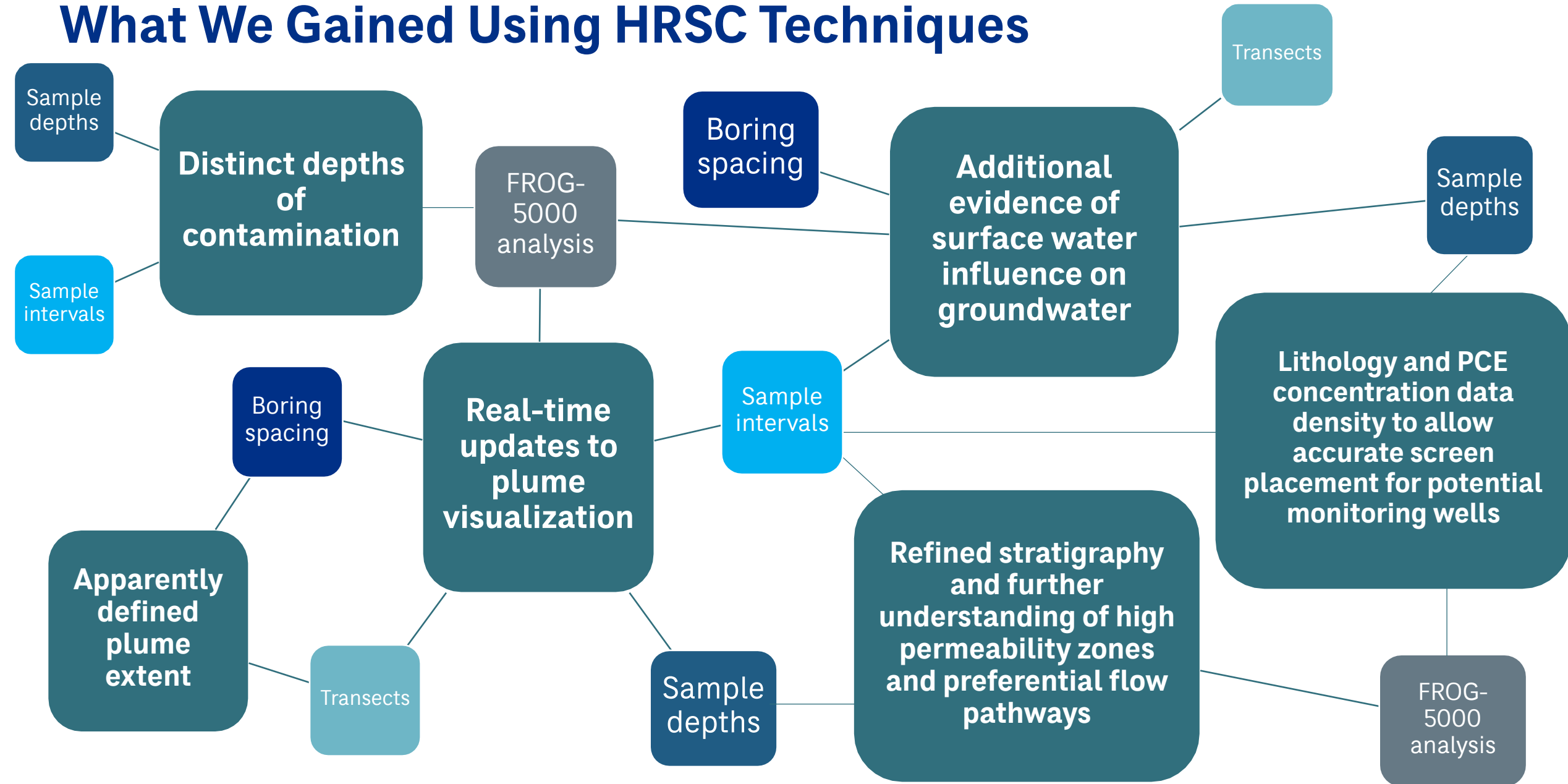


Surface Water and Groundwater Interactions



- Shallow aquifer confined by quaternary alluvium beneath OU1
- Potentiometric surfaces 1 to 2 feet higher than creek surface water elevations
- PCE detected in nearly all of the wet season surface water sample locations
- PCE detected at lower concentrations, and at fewer sample locations in dry season

What We Gained Using HRSC Techniques

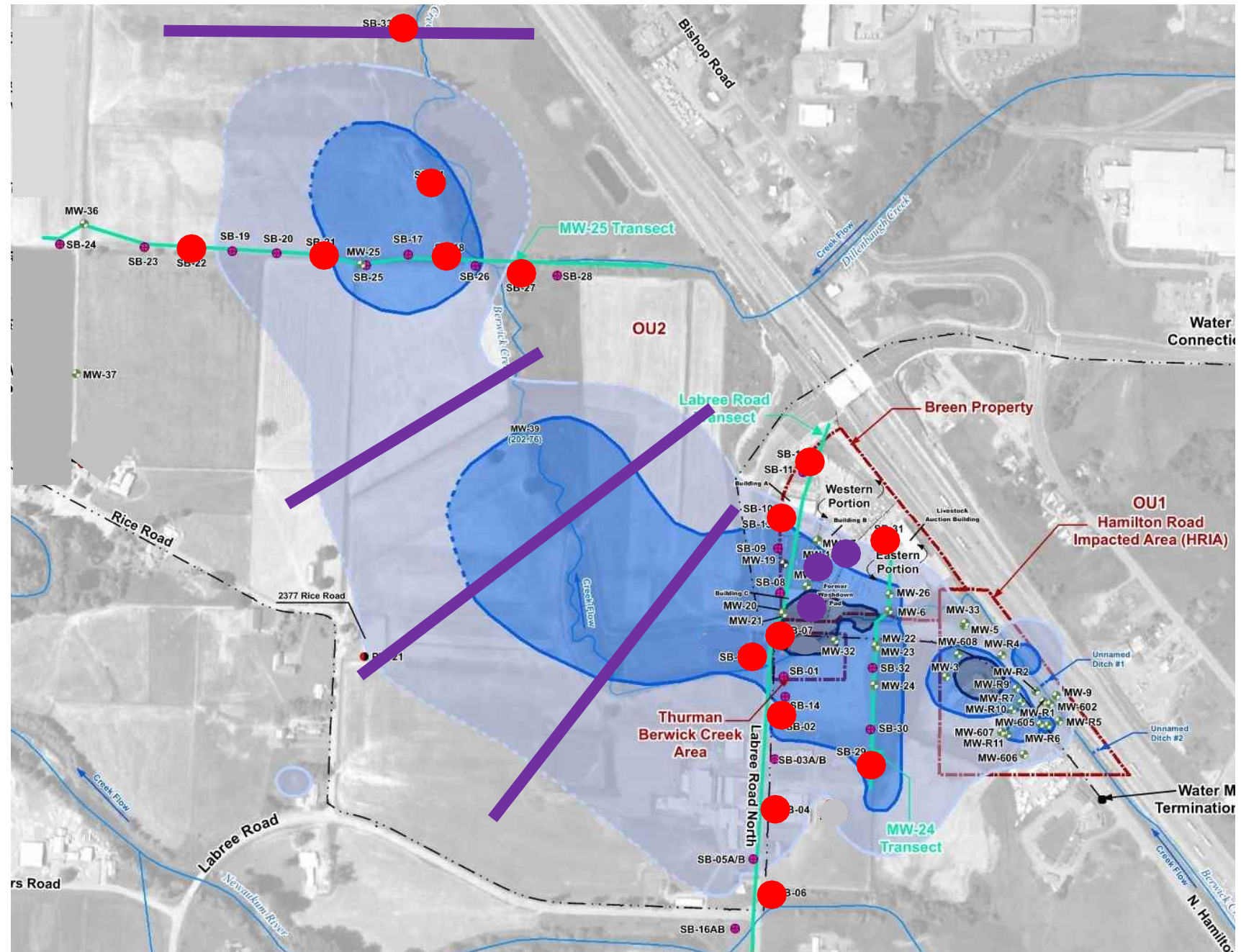




Future Work

Potential Future Work

- Three mid-plume transects
- Further exploration at source areas
- Monitoring well installation
- Stream survey
- Geophysical logging and NMR on installed monitoring wells



Thank you!



To learn more, contact:

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